

Agricultural Knowledge Information System (AKIS) in Cooch Behar District of West Bengal: the Actors and their Inter-linkage with Respect to Agricultural Knowledge and Information Communication

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ABSTRACT: Agricultural Knowledge Information System (AKIS) is a network of actors in a platform of innovation who are complementary to each other and make contributions towards innovation. The effectiveness and success of an AKIS depends upon the meaningful participation of these actors in this system, the way they are linked with this system and the nature of relationship created by their linkage. The study was undertaken in Cooch Behar district of West Bengal, India to explore the actors involved in generation and dissemination of agricultural knowledge and information and inter-linkage among them. Linkage strength measures the quantitative achievement of an actor on total number of dimensions of linkage established in an AKIS, whether, linkage diversity lights on the qualitative expansion of linkage built by an actor over all other actors playing in that AKIS. There are very few studies conducted on AKIS and it was great challenge for the investigator to mobilize the officials to collect linkage information. The study revealed that Cooch Behar is having different actors playing in its AKIS platform and are interlinked satisfactorily to produce a pluralistic system of extension. The linkage diversity with average value of 0.80 for the whole district reflects that the linkage network is substantially dense among the AKIS actors in the district, although the strength of linkage is rather weak with average value of 0.183 for the district.

Keywords: AKIS, Actors, Linkage Diversity, Linkage Strength, Cooch Behar

INTRODUCTION

An Agricultural Knowledge Information System (AKIS) is perceived as a network of actors in a theatre of innovation who make contributions that are complementary towards innovation (Röling, 2004). FAO and World Bank (2000) elaborated the concept of an AKIS as an agricultural knowledge and information system which links rural people and institutions to promote mutual learning and sharing, generate and utilise agriculture related technology, knowledge and information. An AKIS is constituted with the actors like farmers, educators, researchers, extensionists, local leaders, NGOs, private sector as well as many others who facilitate a synergistic action towards agricultural development (Röling, 2004). The effectiveness and success of an AKIS depends upon the meaningful participation of these actors in this system, the way they are linked with this system and the nature of relationship created by their linkage (Röling and Engel, 1992; Engel, 1997). These links and relationship facilitate exchange of information between different bands of actors and helps in translation of research findings into farming practices (Kaine *et al.*, 1999). There are different institutions which play vital roles to achieve prosperity for the farmers with overall

agricultural development in its area of operation by linkage with other actors or institutions. The present study explored the actors involved in generation and dissemination of agricultural knowledge and information and inter-linkage among them. Quantity and quality of linkage among the actors were assessed through two different constructs namely, Linkage Strength and Linkage Diversity. Linkage strength was calculated for each actor

MATERIALS AND METHODS

The study was undertaken in Cooch Behar district of West Bengal, India. Cooch Behar is located in the north-eastern part of the state and lies between 25°57'40" and 26°32'20" N and between 88°47'40" and 89°54'35" E. Politically it has 12 blocks. Among these 12 blocks, the present study undertook 3 blocks randomly and selected all the institutional sources responsible for generation and dissemination of agricultural knowledge and information in the block.

The linkage of an organization with different other organizations was measured on five dimensions as (i) Policy and administrative dimension, (ii) Research dimension (technology generation and backstopping), (iii) Extension dimension (technology dissemination

through training and demonstration), (iv) Resource dimension (manpower sharing and fund sharing) and (v) Service dimension (product marketing, consultancy etc.) (Panda, 2020). The different types of organizations taken for the study were public organisations like University, Krishi Vigyan Kendra, line departments, (agriculture, animal husbandry, fishery, horticulture, soil conservation, sericulture etc.), Agricultural Technology Management Agencies, District Rural Development Centre, Comprehensive Area Development Corporation, banks etc; private organisations like input dealers, corporate sectors; NGOs and Farmers' organizations.

Quantity and quality of linkage among the actors were assessed through two different constructs namely, Linkage Strength and Linkage Diversity. Linkage strength was calculated for each actor as:

$$\text{Linkage strength} = \frac{\text{Sum total of linkage scores obtained by an actor over all the other actors}}{K.S}$$

Where, K = Total number of actors playing in the AKIS, and
 S = Maximum linkage score obtainable from any actor

The linkage was measured with a 6-point scale through no linkage (0), linkage on one dimension (1) and so on up to linkage on all five dimensions (5).

Linkage diversity was calculated using Herfindal Diversity Index (HDI) as:

$$\text{HDI} = 1 - \sum p_i^2$$

where, $p_i = \frac{n}{N}$, and n is the linkage score obtained by the actor with i th actor, and N is the total number of linkage score obtained by the actor over all other actors.

Linkage strength measures the quantitative achievement of an actor on total number of dimensions of linkage established in an AKIS, whether, linkage diversity lights on the qualitative expansion of linkage built by an actor over all other actors playing in that AKIS.



Fig.1. Collection of information from the study area.

RESULTS AND DISCUSSIONS

In Cooch Behar district, agricultural knowledge and information network consists of public, private, Non-Government, autonomous and farmer-networks as actors of AKIS. Table 1 presents the AKIS actors and their role in agricultural knowledge and information network.

Table 1 depicts that among different actors *Krishi Vigyan Kendra*, Agriculture department, Horticulture department, Fishery department, Comprehensive Area Development Corporation and NABARD are undertaking highest numbers of AKIS services in the

AKIS of Cooch Behar district followed by Animal Resource department, Agricultural Technology Management Agency, Sericulture department, Farmers Club, Farmer Producer Organization, Farmer's Cooperative. Soil Conservation department, Private Company, Input Dealer, Nationalized Bank and Microfinance Institutes are providing limited numbers of services. It is also found that all the actors are providing similar types of services in all the studied blocks of Cooch Behar. It can be concluded that the Cooch Behar is homogeneous in accessing the services of AKIS actors as per their role.

Table 1: AKIS services undertaken by different actors of AKIS in Cooch Behar.

AKIS actors	AKIS services undertaken (Superscript indicates Block under study)	Key for AKIS services
1. State Agricultural University	FGHIJK ^{1,2,3}	A=Input supply; B=Output marketing; C=Market information; D=Loans and other forms of credit; E=Providing subsidy; F=Technology backstop; G=Training for knowledge development; H=Training for production skill development; I=Training for business skill development; J= Providing educational services; K=Providing welfare services; L= Facilitate access to development institution for different services; M= Implementing govt. development schemes; N=Providing weather, climate and ecological services. 1=Cooch Behar-I block 2=Cooch Behar-II block 3=Mathabhanga-II block
2. <i>Krishi Vigyan Kendra</i>	ACFGHILMN ^{1,2,3}	
3. Agriculture department	ACEFGHIKM ^{1,2,3}	
4. Horticulture department	ABCEFGHIJLM ^{1,2,3}	
5. Animal Resource department	AFGHIM ^{1,2,3}	
6. Fishery department	ACDEFGHMN ^{1,2,3}	
7. Soil Conservation department	GM ^{1,2,3}	
8. Agricultural Technology Management Agency	ACEFGHIK ^{1,2,3}	
9. Comprehensive Area Development Corporation	ABCFGHIJKM ^{1,2,3}	
10. Sericulture department	ACFHIM ^{1,2,3}	
11. Farmers Club	ABCHM ^{1,2,3}	
12. Farmer Producer Organization	ABCHM ^{1,2,3}	
13. Farmer's Cooperative	AGIKM ^{1,2,3}	
14. Private Company	A ^{1,2,3}	
15. Input Dealer	A ^{1,2,3}	
16. NABARD	DEFGHILM ^{1,2,3}	
17. Nationalized Bank	DM ^{1,2,3}	
18. Microfinance Institute	DM ^{1,2,3}	

Table 2: Inter-Linkage among AKIS actors in Cooch Behar district.

AKIS actors	Linkage Diversity (Densest=1, Thinnest=0)			Linkage Strength (Strongest=1, Weakest=0)		
	COB-I	COB-II	MTB-II	COB-I	COB-II	MTB-II
1. State Agricultural University	0.83	0.83	0.83	0.18	0.18	0.18
2. <i>Krishi Vigyan Kendra</i>	0.92	0.90	0.92	0.51	0.41	0.53
3. Agriculture department	0.90	0.89	0.89	0.28	0.26	0.24
4. Horticulture department	0.87	0.85	0.87	0.21	0.18	0.22
5. Animal Resource department	0.80	0.81	0.81	0.16	0.15	0.15
6. Fishery department	0.74	0.74	0.76	0.09	0.09	0.12
7. Soil Conservation department	0.67	0.67	0.67	0.06	0.06	0.06
8. Agricultural Technology Management Agency	0.91	0.91	0.90	0.34	0.31	0.23
9. Comprehensive Area Development Corporation	0.91	0.91	0.91	0.32	0.32	0.32
10. Sericulture department	0.78	0.78	0.79	0.13	0.13	0.16
11. Farmers Club	0.90	0.90	0.90	0.34	0.34	0.34
12. Farmer Producer Organization	0.90	0.90	0.90	0.34	0.34	0.34
13. Farmer's Cooperative	0.82	0.82	0.83	0.07	0.07	0.06
14. Private Company	0.87	0.86	0.88	0.15	0.16	0.11
15. Input Dealer	0.75	0.75	0.75	0.04	0.04	0.04
16. NABARD	0.88	0.89	0.87	0.13	0.14	0.17
17. Nationalized Bank	0.50	0.50	0.50	0.02	0.02	0.02
18. Microfinance Institute	0.50	0.50	0.50	0.02	0.02	0.02
<i>Average Value</i>	0.80	0.80	0.80	0.19	0.18	0.18
<i>Statistical Implication (Kruskal Wallis Test)</i>	<i>H=0.046 (p=.977)</i>			<i>H=0.010 (p=.996)</i>		

COB-I=Cooch Behar-I Block; COB-II=Cooch Behar-II Block; MTB-II=Mathabhanga-II Block

Table 2 represents the quality and quantity of linkage among the actors of AKIS in Cooch Behar district of West Bengal. It is seen from the table that in both linkage diversity and linkage strength, *Krishi Vigyan Kendra* (KVK) achieved the highest position among all other actors. KVK is the grass-root institute in a district which acts as a knowledge and information resource centre for the promotion of agricultural development. The activity of KVK is spread over the whole district

and it develops linkage with all other actors in an AKIS on convergence mode. The Agricultural Technology Management Agency (ATMA) and Comprehensive Area Development Corporation (CADC) are the rural and agricultural development and acts in the similar way as a KVK acts. Farmers' Club (FC) and Farmers Producers' Organisations (FPO, the expanded model of Farmers' club) are the window to disseminate the services of all the other actors present in an AKIS. The

value of both linkage diversity and strength of CADC, ATMA, FC and FPO reflects this fact. The line departments (agriculture, horticulture, animal husbandry and sericulture) also contributed significantly in agricultural knowledge and information communication. In the era of pluralistic extension system all the service providers are somehow interrelated with other to provide agricultural services to the end users. Such interrelated network will increase the performance (Sulaiman, 2003) which may stimulate increased agricultural productivity (Berdegué and Escobar, 2001).

The average values of linkage diversity of all the AKISs in different study blocks spells out that the quality of inter-linkage among the AKIS actors are on the upper side, whereas, the strength is in the lower side, which supports the findings of Rees *et al.* (2000). With this observation, it can be said that the inter-linkage network among the actors of all the block level AKISs are dense in nature but not that much strong. The Kruskal Wallis test (H-value) reports that both linkage diversity and linkage strength are not significant. So, it can be concluded that the whole district is homogeneous with respect to inter-linkage among the AKIS-actors towards agricultural knowledge and information communication.

CONCLUSION

Cooch Behar, a northern district in the state of West Bengal in India is having the actors in the broad bands of public, private, autonomous, individual and non-government organisations in its AKIS platform and are interlinked satisfactorily to produce a pluralistic system of extension. Among the five broad dimensions of linkage as policy and administrative dimension, research dimension, extension dimension, resource dimension and service dimension, the actors are interlinked with each other although not with every dimensions. The linkage diversity (average value=0.80 for the district), which tells about the density of the linkage matrix reflects that the linkage network is substantially dense among the AKIS actors in the district, although the strength of linkage is rather weak (average strength value = 0.183 for the district). The study can be conducted to find out the linkages between different state organisations for delivery of agricultural information to the farmers. There is a scope to find out

the best information delivery system between the organisations.

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